REPORT ON
APPLICABILITY OF VOLUNTARY, BEYOND COMPLIANCE PROGRAMS TO THE VIRTUAL ELIMINATION STRATEGY

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EXECUTIVE SUMMARY

The United States-Canada Great Lakes Water Quality Agreement states that "the discharge of toxic substances in toxic amounts be prohibited and the discharge of any or all persistent toxic substances be virtually eliminated." The International Joint Commission (IJC) has recommended that a binational strategy be developed to virtually eliminate persistent toxic substances from the Great Lakes ecosystem within a philosophy of zero discharge. In response to these commitments and recommendations, Environment Canada (EC) and the U.S. Environmental Protection Agency (EPA), in cooperation with the Great Lakes states and provincial governments, developed a binational virtual elimination strategy. Specifically, the strategy commits the governments to work with other public and private partners toward the goal of virtual elimination of persistent toxic substances resulting from human activity, particularly those which bioaccumulate, so as to protect and ensure the health and integrity of the Great Lakes ecosystem.

As part of its role of reviewing and evaluating progress under the Great Lakes Water Quality Agreement, the IJC established the evaluation of significant sources, pathways, and reduction/ elimination strategies of persistent toxic substances as one of its 1995-1997 program priorities. In response to this program priority, the Great Lakes Water Quality Board of the IJC commissioned this report to evaluate the potential role that voluntary, beyond compliance programs could play in the virtual elimination of persistent toxic substances from the Great Lakes ecosystem.

Information was collected in a series of interviews with government officials in the Illinois Environmental Protection Agency (IEPA), the Michigan Department of Environmental Quality (MDEQ), the Ontario Ministry of Environment and Energy (OMEE), EC, and the EPA Region 5. The purpose of these interviews was to identify and evaluate the success of current voluntary beyond compliance programs. Were these programs able to attract participants and generate reductions? What factors contributed to programmatic success? Finally, could these programs/ approaches be used to reduce Level I and II substances?

This Executive Summary presents key findings and recommendations found in the report.

FINDINGS

- Many of the Level I and Level II contaminants have been banned (e.g. pesticides). In other cases, these contaminants are inadvertent byproducts of production/waste management

processes (e.g. incomplete combustion). Traditional, voluntary, beyond compliance programs, which generally have involved promoting pollution prevention through award, partnership and technical assistance programs, may have limited applicability in addressing these contaminants. Other contaminants, which are still used in production, services, and activities (e.g. cadmium) may be more conducive to traditional, beyond compliance programs.

- In general, larger facilities, those with environmental health and safety (EH&S) staffs, have been open to pollution prevention initiatives. They have identified "low-hanging fruit" where cost-saving and environmental performance objectives intersected, and have taken actions resulting in reductions.

- Many of the costs avoided were realized as a result of the costs associated with waste treatment and management. Additionally, the threat of regulation has spurred pollution prevention actions.

- Facilities may be willing to take further voluntary actions, but they need to realize some benefits. Many of them are looking for regulatory relief, such as longer permit terms, fewer reporting requirements, and more flexibility in achieving environmental objectives.

- At the same time, many smaller facilities require technical assistance to identify and realize the economic benefits associated with pollution prevention. For these facilities, the jurisdictions have recognized that regulators are often not the best messengers. The jurisdictions are using a variety of messengers, including trade associations, larger facilities to "mentor" smaller facilities, peers, retirees, etc., to spread the pollution prevention ethic. Additionally, many of these outreach efforts involve new forms of partnerships. For example, the Great Printers Project involves sponsors from industry, government, and non-governmental organizations (NGOs).

- The States are willing to experiment with regulatory flexibility and, in some cases, have developed the statutory/regulatory construct to exercise that flexibility. Using regulatory flexibility as an incentive, the jurisdictions will challenge the private sector to identify and evaluate opportunities for further reductions. While EPA has verbalized its interest in using regulatory flexibility as an avenue for further reductions, it needs to more aggressively demonstrate, in practice, its willingness to provide such flexibility.

RECOMMENDATIONS

- The IJC and/or the Parties/Jurisdictions should develop an inventory of uses of the persistent contaminants of concern and, to the extent possible, estimated volumes/releases by source category and site-specific sources.

- The IJC and/or the Parties/Jurisdictions should identify which of these contaminants may be a candidate for reduction through one or more incentive-based programs.

- As a first step, the IJC and/or the Parties/Jurisdictions should plan a workshop session in which government and industry can jointly develop and evaluate contaminant "use trees," identify where reductions are possible, and evaluate incentives that the Parties/Jurisdictions might provide industry in exchange for further reductions.

- The IJC should challenge the Parties/Jurisdictions to lead by example by reducing the generation of the Level I and II substances as a result of their activities, products, and services. A workgroup should be established to consider where and how this might be accomplished. The Parties/Jurisdictions should identify, undertake and publicize their actions.

- Many organizations, particularly large multinationals, are now in the early stages of evaluating their interest in achieving ISO 14000 certification. ISO 14000 is a process-oriented management tool designed to improve an organization's environmental performance. However, each organization selects its own performance objectives. The IJC, and/or the Parties/Jurisdictions, should establish an outreach program to ensure that all organizations in the Great Lakes Basin seeking to achieve ISO 14000 certification identify persistent contaminants as "significant environmental aspects" of their activities, products, and services. Moreover, the IJC and/or the Parties/Jurisdictions should work to see that the larger organizations induce their supply chains to consider reduction of the same contaminants (e.g. through changes in procurement standards).

- Existing technical assistance programs conducted by the Parties/Jurisdictions can be targeted toward some of the Level I and II contaminants. Indeed, some of these programs are already focusing on industrial sectors using these contaminants. However, not all of the sources, or contaminants, will be susceptible to the incentives currently used by these programs. The Parties/Jurisdictions should be encouraged to ensure that the sectors, processes, and activities of concern are fully evaluated as part of these technical assistance programs. Organizations reducing the contaminants of concern should be eligible to receive some form of credit, whether it is public recognition or some form of regulatory flexibility. The "credit" should be established with reference to the time/dollars expended and/or reductions achieved by the organization.

- The IJC and/or the Parties/Jurisdictions should work to identify what market-based incentive programs might be established to encourage industry to assist in the remediation of historic contamination (e.g. PCB-laden sediments). For example, an industry could adopt an "orphan site" for remediation in exchange for longer permit terms, extended compliance deadlines, or other form of regulatory flexibility.

- Actions should also be taken to encourage reductions of Level I and II contaminants that are incidental byproducts (e.g. PAHs) of the production/waste management process. Perhaps the Parties/Jurisdictions could explore providing regulatory flexibility in exchange for an organizational commitment to conduct research and development to reduce the generation of these contaminants.

- The Great Lakes have seen tremendous environmental improvement over the last few decades. However, persistent substances continue to plague the system. Regulatory flexibility may provide incentives for further reductions. The IJC and/or Parties/Jurisdictions should give voluntary, beyond compliance programs the opportunity to work. The Parties/Jurisdictions have demonstrated that economic incentives can provide for reductions, and still more reductions will accrue as a result of outreach efforts. The IJC should encourage the Parties/Jurisdictions to evaluate whether additional incentive-based programs can be designed to generate still greater reductions.

1. INTRODUCTION

The United States-Canada Great Lakes Water Quality Agreement calls for the virtual elimination of the discharge of persistent toxic substances.[1] In keeping with this objective, Environment Canada and EPA, in cooperation with the Great Lakes states and provinces, have prepared a draft Binational Virtual Elimination Strategy. The draft Strategy commits the U.S. and Canadian Government to work with other public and private partners to virtually eliminate persistent toxic substances resulting from human activity, particularly those that bioaccumulate, to protect and ensure the health and integrity of the Great Lakes ecosystem.[2] One approach for achieving this goal is to use voluntary, beyond compliance programs to target reductions of these substances. This report summarizes the results of interviews conducted to determine whether voluntary, beyond compliance programs can be used to address the problem of persistent toxic substances in the Great Lakes. In addition, the report provides recommendations based on the interview results.

1.1 PURPOSE OF THIS PROJECT

This project was commissioned to assess how voluntary, beyond compliance programs could be used to reduce loadings of persistent toxic substances to the Great Lakes. The parties classified these substances as Level I and II (**see Exhibit 1**). As described in the draft Strategy, Level I contaminants are defined as those contaminants that have been associated with or have the immediate potential to cause deleterious environmental impacts as a result of their presence. Level II contaminants are defined as those contaminants that have the potential for significantly affecting the ecosystem through their use and release. The draft Strategy calls for reductions of both Level I and II substances.

At present, national, state, and provincial governments are sponsoring a diversity of voluntary, beyond compliance programs, though the majority of these programs are not specifically targeted at reducing releases of the persistent toxics. Over a 1-week period in mid-January 1997, national, state, and provincial officials involved in sponsoring voluntary, beyond compliance programs were interviewed to assess the success of these programs. The objective of the interviews was to identify, to the degree possible, the critical success factors of the voluntary,

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[1] United States and Canada. 1987. Great Lakes Water Quality Agreement, International Joint Commission, Windsor, Ontario, 64 pp.

[2] Environment Canada and U.S. Environmental Protection Agency. 1996. Canada-United States Draft Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes Basin. Toronto, Ontario, and Chicago, Illinois, 20 pp.

Exhibit 1: Persistent Toxic Substances

Level I Substances[1]

Aldrin/dieldrin

Benzo(a)pyrene {B(a)P}

Chlordane

DDT (+DDD+DDE)

Hexachlorobenzene

Alkyl-lead

Mercury and mercury compounds

Mirex

Octachlorostyrene

PCBs

Dioxins and Furans 92,3,7,8-TCDD toxicity equivalents)

Toxaphene

Level II Substances[2]

4-bromophenyl phenyl ether

Cadmium and cadmium compounds

1,4-dichlorobenzene

3,3'-dichlorobenzidine

Dinitropyrene

Endrin

Heptachlor (+Heptachlor epoxide)

Hexachlorobutadiene (+Hexachloro-1,3-butadiene)

Hexachlorocyclohexane (including alpha, beta, delta, lindane)

4,4'-methylenebis(2-chloroaniline)

Methoxychlor

Pentachlorobenzene

Pentachlorophenol

Tetrachlorobenzne (1,2,3,4- and 1,2,4,5-)

Tributyl tin

Plus PAHs as a group, including but not limited to:

Anthracene

Benzo(a)anthracene

Benzo(g,h,i) perylene

Perylene

Phenanthrene

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[1] Level I substances are the 11 critical pollutants identified by the IJC's Great Lakes Quality Board, plus two additional critical pollutants identified by the Lake Superior LaMP and the Lake Ontario Toxics Management Plan (Octachlorostyrene and chlordane).

[2] Level II substances are those substances identified by the Canada-Ontario Agreement respecting the Great Lakes Basin Ecosystem (COA) as "Tier II" chemicals, plus additional substances of concern identified by LaMP and RAP processes and the Great Lakes Water Quality Guidance in the United States.

beyond compliance programs, so that the programs can be targeted, amended, and/or new programs created, to reduce releases of persistent toxics to the Great Lakes Basin. This paper discusses several voluntary, beyond compliance programs currently in-place and identifies programmatic aspects that can be modified, or used as building blocks of new programs, to target the reduction of persistent toxics.

Project findings will be discussed during a May 21-22, 1997, workshop sponsored by the Joint International Air Quality Advisory Board and Great Lakes Water Quality Board.

1.2 ORGANIZATION OF THIS REPORT

The remainder of this report is organized into four major sections.

Section 2 presents background information on issues facing managers of voluntary, beyond compliance programs. Program managers must identify incentives that can be used to recruit participation and generate reductions. In targeting the persistent toxics of concern, program managers need to understand which sources release the contaminants of concern, and what incentives might work to drive these sources to take action.

Section 3 provides the findings of the interviews held with managers and staff in IEPA, MDEQ, OMEE, EC, and EPA Region 5. This section discusses the features of a subset of voluntary, beyond compliance programs in each jurisdiction. This section is <u>not</u> intended to review all voluntary, beyond compliance programs sponsored by the jurisdictions.

Section 4 provides summary recommendations for targeting voluntary, beyond compliance programs at the persistent toxics of concern. This section includes general and specific recommendations that program managers can take to address the persistent toxics.

Section 5 provides concluding remarks.

2. BACKGROUND

Together, the national, state, and provincial governments have had great success in reducing environmental contamination of the Great Lakes. Despite significant successes in reducing toxic substances in the Great Lakes, including actions taken to ban, cancel, and restrict the use of a number of persistent toxics, these substances continue to present threats to the Great Lakes ecosystem. Thus, Canada and the United States developed a draft strategy that seeks to achieve virtual elimination of persistent toxics "...within the most expedient time frame through the most appropriate, common sense, practical and cost-effective blend of voluntary, regulatory or incentive-based actions."[3] As earlier noted, this paper was commissioned to determine how voluntary, beyond compliance programs could be fashioned to reduce releases of persistent toxics.

The question of how voluntary, beyond compliance programs should be structured is an issue of concern both within and outside of the Great Lakes region. Within the Great Lakes region, a tremendous number of regulatory and non-regulatory actions have already been implemented to reduce toxic releases. Can Great Lakes environmental managers design voluntary, beyond compliance programs with sufficient incentives to attract participants and achieve further loading reductions? This section identifies the success of an early voluntary, beyond compliance program. It also discusses the need to identify and work incentive systems.

2.1 SUCCESS OF AN EARLY VOLUNTARY, BEYOND COMPLIANCE PROGRAM

In the late 1980s, the business concept of total quality management (TQM) dovetailed with the environmental concept of a pollution prevention hierarchy. Both concepts seek to reduce waste, though the business concept strives to cut waste to increase profitability, while the environmental concept strives to cut waste to decrease stress on the environment. Within this context, corporate environmental health and safety (EH&S) managers were able to align their objectives with business objectives.

> The TQM management philosophy, first practiced by Japanese corporations, demonstrated that process improvements can both reduce production costs and increase sales. The pollution prevention hierarchy provides that reduction at the source offers greater environmental improvement, as well as associated cost savings, compared to other environmental protection measures, such as waste treatment and disposal.

[3] Canada-United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes Basin, p.4.

This alliance of quality and environmental improvement objectives enabled corporate EH&S staff to increase their credibility within the organization. They were able to demonstrate that their jobs offer more than what has been labeled "babysitting liabilities," activities such as completing compliance documentation for government authorities. EH&S staff could work with production units to generate process improvements that both enhanced production efficiency and reduced pollutant generation.

As a result of the confluence of business and environmental philosophies, EPA's 33/50 Program proved extremely successful. EPA challenged corporate executive officers to meet reduction targets, and about 1,300 companies embraced the goal. Both the 33-percent and 50-percent national pollutant reduction goals were achieved a year ahead of schedule. The final numbers for the 1994 Toxics Release Inventory (TRI) demonstrated nearly a 51-percent reduction from the 1988 baseline, a reduction of 757 million pounds. Among the States with the "top ten" reductions are the Great Lakes States of Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania. The size of the reductions achieved was in part possible due to what has been characterized as a "reluctance" to internalize environmental issues into business planning between 1970 and 1985. Consequently, industry was poised in the late 1980's "...to make easy, but often very significant, improvements...."[4]

The 33/50 success casts a shadow over voluntary, beyond compliance programs. The confluence of TQM and pollution prevention philosophies, and EPA's recognition that TQM would create the impetus to reduce waste generation, enabled EPA to "declare victory" from this ambitious effort. While EPA produced numerous pollution prevention success stories and disseminated these stories in press and over the Internet, reductions were largely achieved without technical assistance from the government. In addition, EPA and State regulators did not need to make any hard choices by offering regulatory/administrative flexibility as an incentive for reductions.

2.2 WORKING THE INCENTIVE SYSTEM: THE CHALLENGE BEYOND 33/50

The confluence of business and environmental objectives in TQM and pollution prevention still exists today. Many smaller and mid-sized organizations have yet to identify the potential cost savings generated from this confluence. For organizations that can readily realize economic benefits, the jurisdictions have been using a variety of communication tools to highlight the associated benefits of economic efficiency and environmental performance. A major challenge

[4] "It's Not Easy Being Green," by Noah Walley and Bradley Whitehead, *Harvard Business Review*, May-June 1994, pp. 46-52.

in working with these smaller and mid-sized organizations has been in building trust, and assuaging fears of working in a cooperative fashion with government agencies.

On the other hand, for those companies that have previously taken action to reduce pollutant releases, the easily-picked "low hanging fruit" is not as readily available as it was just 7 years ago. Clearly, if the government defines a subset of contaminants as being "of concern," that reduces the flexibility of a potential recruit to identify contaminants that can be reduced most cost-effectively. At the same time, corporate EH&S professionals are under the same pressure as other corporate organizations in this time of downsizing. They need to demonstrate their value to the organization.

GEMI, a group of Fortune 500 companies, has spearheaded the concept of Total Quality Environmental Management (TQEM), issuing literature and conducting meetings and workshops to disseminate the concept that improving environmental quality could also promote shareholder value.

As reported by the Global Environmental Management Initiative (GEMI), favorable public opinion can motivate organizations to undertake beyond compliance actions. Enhancing an organization's environmental image can contribute to the marketability of an organization's products. Public opinion may not be a sufficient motivator to make further improvements in environmental performance, however.[5] While public opinion can often present a substantial business incentive, it may not provide a sufficient incentive for more costly beyond compliance actions. EH&S organizations that successfully implemented TQEM philosophies are now being challenged by government agencies to reduce emissions further. Corporate EH&S professionals need to demonstrate that improved environmental performance is consistent with increasing shareholder value. What incentives can the government offer to these organizations?

Incentives will have to be fashioned for the particular organization(s) of concern, with respect to the following factors: the organization's financial health, its plans for the future growth, EH&S sophistication, and the source/use of the contaminant in the organization products, activities, and services. Currently, as demonstrated herein, the majority of beyond compliance programs stress the demonstration of the confluence of environmental improvement and economic savings, targeting outreach and technical assistance to small and mid-sized organizations. A major challenge facing government sponsors has been finding the right delivery mechanism for providing assistance to small and mid-sized organizations. Larger organizations,

[5] "Corporate Environmental, Health and Safety Practices in Transition: Management System Responses to Changing Public Expectations, Regulatory Requirements, and Incentives," Terry F. Yosie and Timothy D. Herbst, for the Global Environmental Management Initiative, September 1996.

with in-place EH&S staff, are less likely to need government-sponsored technical assistance. Beyond compliance programs have been using public recognition as the means of attracting the interest and participation of larger organizations. Governments are now experimenting with the use of administrative/regulatory flexibility, and incentive-based, market-oriented programs, to draw additional participation.

3. SUMMARY OF SURVEY FINDINGS

Conversations were held with federal, state, and provincial staff in Illinois, Michigan, and Ontario during mid-January 1997. Appendix A provides a complete listing of interviewees. Not all programs discussed during the interviews received equal attention during the interview and, consequently, those that received lesser attention are generally not described herein. Additionally, discussions with EPA Region 5 largely addressed programs underway in the midwestern states. Consequently, these discussions are not identified separately in this section, but were used to amplify explanations of programs underway in Illinois and Michigan.

While no specified interview protocol was used during these conversations, conversations were directed toward developing a summary description of the voluntary, beyond compliance program(s) with which the interviewees were most familiar; the factors that contributed to the program's success; whether the program could be targeted at the persistent toxics with some adjustment; and/or whether the critical factors of success could be used in creating new program(s) specifically targeted at the persistent toxics. In some cases, interviewees were not able to discuss whether program adjustments might be possible to target the persistent toxics.

The following discussion is divided into two subsections. The first subsection describes the programs in which the government did not offer any regulatory/administrative flexibility as a means of attracting recruits. The second subsection highlights the programs in which the government has offered regulatory/administrative flexibility as a means of attracting recruits.

3.1 PROGRAMS WITHOUT REGULATORY/ADMINISTRATIVE FLEXIBILITY

As described in this subsection, the states and province are sponsoring a wide variety of voluntary, beyond compliance programs in which government sponsors did not offer any regulatory/administrative flexibility to attract recruits. The focus of these voluntary, beyond compliance programs tends to involve building institutional interest and capacity in pollution prevention. Programmatic goals are established depending on the client of interest and can be general or specific. For example, the goal may be to supply clients with a general introduction to environmental stewardship concepts or to target general or pollutant-specific reduction commitments. Three subsections are presented, focusing on Illinois, Ontario, and Michigan programs.

3.1.1 Illinois

IEPA uses different messengers to generate interest in pollution prevention, including IEPA staff, other state staff (such as the Illinois Waste Management and Research Center), graduate students, and a peer network.

With respect to a peer network, IEPA is currently exploring methods to deliver its beyond compliance message by using individuals and institutions with long-term credibility with small and medium-sized businesses. Surveys have shown that small and mid-sized businesses look toward their competitors, buyers, and suppliers, as well as their accountants and attorneys, when considering business decisions. In contrast, surveys have also shown that small businesses do not have a high level of trust in regulatory agencies.

Non-Regulatory Messengers

IEPA is developing an 8-hour course for accountants that work with small and medium-sized businesses. This course will summarize pollution prevention concepts, as well as identify specific case studies that demonstrate the relationship of pollution prevention to material savings and cost reductions achieved. The expectation is that accountants may introduce their clients to environmental performance practices that offer the potential for reducing both costs and pollutant releases.

IEPA also offers eligible organizations (both corporations and non-profits) the opportunity to supplement their EH&S staffs with graduate students paid by IEPA. The graduate student, typically a chemical or environmental engineering student, is paid a stipend by the State. The purpose of this program is to lend technical assistance to EH&S organizations that have identified real opportunities for waste reductions, yet do not have the time and/or expertise to implement these opportunities.

To become eligible, the organization must prepare a proposal describing a source reduction/ recycling effort that they would like to pursue with the assistance of a graduate student. IEPA has run the program for 3 to 4 years and has, in the past, received 15 to 20 applications annually. The program has experienced real successes, including the patenting of a new painting process offering source reduction benefits. However, the program's successes have not been well-documented, and the spin-off potential has been limited.

Sector-Specific Programs

Recognizing that small and mid-sized businesses are more open to reviewing pollution prevention opportunities if introduced to the concept by their peers, Illinois has initiated sector-specific projects, and expects to participate in more sector-specific projects (e.g., foundries) in the future.

Like other midwestern states, Illinois has embraced the Great Printers Project. The Great Printers Project features a variety of simple-to-read brochures and case studies that highlight specific processes and the waste and cost reductions that can be achieved without sacrificing product quality. Case studies describe the cost savings achieved by competitors. To attain Great Printer status, a printer must develop and implement a pollution prevention program.

The Great Printers Project is still in its initial stages, and it is difficult to predict the level of success it will have in generating participation and reductions. Illinois is putting substantial effort into ensuring the program's success, however. To generate interest in the project, Illinois offers a variety of technical assistance programs for program participants. Among other things, Illinois is working closely with the printing industry to develop an environmental compliance guide, including an example generic operating permit.[6]

Partners in P2

IEPA has sponsored a Partners in P2 Program since 1990. Approximately 200 larger-sized companies have taken part in the program. This program was developed as a voluntary effort to quell business concern that the state might require pollution prevention planning by regulation. Consequently, a variety of trade associations worked to ensure that their members would enlist in the program. To enlist in the program, interested businesses had to meet eligibility criteria, including having a pollution prevention policy in place, identifying a pollution prevention coordinator, and conducting a waste reduction assessment.

The Partners in P2 Program has had positive results. Facilities reduced emissions and the public recognition that companies received improved the standing of EH&S staff within participating organizations. However, the program has not generated any substantial spin-off opportunities that would work to increase the number of Illinois businesses participating in beyond compliance pollutant reductions. Consequently, IEPA is now in the process of restructuring the program.

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[6] See Subsection 3.2.1, which describes how Illinois is using enforcement discretion to build participation in the Great Printers Project. Section 3.1.3, which describes Michigan's programmatic initiatives, also discusses the Great Printers Project.

The program's eligibility requirements did not include a commitment from partners to provide case studies as a condition of project eligibility, or to any type of outreach effort, such as attending annual conferences to publicize successes or becoming involved in a monitoring program. Consequently, it has proven difficult to use programmatic successes as a means of publicizing the business value of waste reduction opportunities.

3.1.2 Ontario

EC and OMEE have jointly funded a number of beyond compliance partnerships. EC and OMEE measure the success of their programs by participation rates, rather than by establishing reduction targets and then assessing whether those targets were achieved. The use of this measure of success suggests the importance that EC and OMEE place on seeding the pollution prevention ethic. EC and OMEE have documented that increasing participation rates yields reductions. OMEE officials felt that requiring reduction targets as a precondition of recruitment could deter participation.

Program officials interviewed were confident that they could generate widespread participation, and subsequent reductions, if they could encourage leaders of change within industry sectors to promote pollution prevention. However, it was recognized that generating widespread participation will take time. Indeed, EC and OMEE believe that once small and mid-sized manufacturers have been introduced to pollution prevention concepts, a 3 to 4-year incubation period might be necessary before the concept is implemented on a widespread basis. In addition, EC and OMEE staff suggested that 3 to 4 meetings with companies and associations are needed before a basic level of trust can be established, thereby clearing the way for substantive discussions.

Trade Association Partnerships

To develop interest in achieving beyond compliance results, EC and OMEE enter into partnerships with trade associations (e.g., the Canadian Association of Metal Finishers [CAMF]) to "promote the development and implementation of site-specific pollution prevention plans by the member companies...."[7] Similar agreements are in place with the printing and graphics and automobile parts industries. Additionally, EC and OMEE will enter into agreements with individual companies.

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[7] Third Progress Report from the Task Force of the Metal Finishing Industry Pollution Prevention Project, September 1996, p. 1.

To effectuate change within industrial sectors, EC and OMEE hire a Project Coordinator with pollution prevention credentials. A trade association administers the Project Coordinator's contract for EC/OMEE, for which it receives an administration fee. In effect, this Project Coordinator acts as a "circuit riding" staff member to the participating firms, which are generally too small to hire environmental expertise within their own operations. EC and OMEE provide additional resources, as necessary, to conduct waste reduction assessments, training sessions, and other technical assistance projects to ensure programmatic success.

Consistent with EC and OMEE's interest in generating increased participation rates, a sector-specific project task force, consisting of government and association representatives, establishes a goal for signing up a specified number of member companies to try pollution prevention techniques and disseminate resultant success stories to the membership. By way of example, to receive funding in subsequent years, the CAMF needs to signup double the number of participants on an annual basis.

EC and OMEE sponsor annual workshops for trade association members that highlight programmatic successes. The last metal finishing workshop highlighted case studies describing resource savings achieved by participants in waste reduction activities. Workshop participants also learned that metal finishers employing pollution prevention techniques have been visited by customers indicating a preference for purchasing supplies from environmentally responsible suppliers.

Voluntary Pollution Prevention Partnerships
Measures of Success

Sector	Activity Measures	Pollutant Reductions
Automobile manufacturing	3 companies 17 facilities 66 projects	150,000 tonnes
Metal finishing/ electroplating	12 companies 10 projects	16 tonnes
Automobile parts manufacturing	6 companies 22 projects	660 tonnes per year
Printing	16 companies 23 facilities	N/A

OMEE is now undergoing severe budget cuts. However, its partnering program with the CAMF have encouraged program managers sufficiently to project that workshops (at $400/ course), and other programmatic aspects, could become self-supporting. If a metal finishing company is willing to conduct an Industrial Waste Audit Program (IWAP) assessment at its facility, EC will compensate the company for

OMEE expects that the automobile industry's interest in ISO 14000 may hasten acceptance of pollution prevention concepts among smaller suppliers, reducing the time frame for acceptance.

one-half of the total cost of the audit ($3,000) provided that the company signs onto the MFI Project, discusses the audit findings with the Task Force, and submits a pollution prevention summary plan based on the audit to the Task Force. If the audit is unable to identify any pollution prevention activity resulting in cost savings, the company will be compensated for the total cost of the audit. Compensation is being provided by EC but the audits are in effect being offered by the Project Task Force and conducted by the consultant who developed the IWAP software.

As noted previously, EC and OMEE's basic strategy has been to generate some initial case studies within the industry by providing circuit-riding pollution prevention experience and then attempt to spread the pollution prevention ethic by using the trade association's network to advertise case study successes among peers.

Dry Cleaning Project

In some economic sectors, EC and OMEE have determined that they need to play a more active role in generating case study examples. In these cases, EC and OMEE will fund and demonstrate pollution prevention techniques. Thus, EC funded a program to demonstrate "wet cleaning" as a viable substitute to perc-based dry cleaning techniques. The Green Clean Project was accomplished in partnership with the Ontario Fabricare Association and the Korean Dry Cleaners Association, as well as with the assistance of nongovernment organizations and municipalities. Initially, the wet cleaning technical assistance effort was developed to demonstrate alternatives to perc, because the EC and Ontario Ministry of Labour were considering more stringent regulations for environmental protection and workplace exposure. As of mid-January, these regulatory efforts had been postponed. However, Minister Marchi recently announced (2/10/97) that there will be a regulatory backstop to encourage the adoption of wet cleaning processes. Approximately 13 locations are currently offering perc-free cleaning, as well as dry cleaning.

> The project consisted of three phases. In the first phase, a drop-off store, known as the Green Clean Depot, was set up and funded by EC to conduct onsite wet cleaning. In the second phase, the Depot was taken over by a private operator, and three more cleaners adopted the use of wet cleaning in addition to dry cleaning. In the third phase, an existing dry cleaning facility removed its perc equipment and replaced it with new wet cleaning technology. EC funded one-half the capital cost of the equipment. The three-phase study determined that wet cleaning was as effective as dry cleaning for most fabrics. While equipment and materials are less expensive in wet cleaning operations, a better-trained, higher paid labor force is required.

3.1.3 Michigan

Michigan has adopted a number of voluntary, beyond compliance programs with broad pollution prevention objectives. In most of these cases, Michigan delivers technical assistance to smaller and mid-sized firms through short informational brochures, technical guidance, and onsite technical assistance. In assisting larger organizations that have EH&S capacity to identify and implement beyond compliance solutions, such as automobile manufacturers, Michigan staff have focused on working with corporate EH&S staff to identify approaches for achieving long-term pollution prevention targets. These approaches can involve institutional capacity-building and integration of a life-cycle assessment philosophy into product design decisions.

Mercury Pollution Prevention Task Force

Since 1994, The Michigan Mercury Pollution Prevention Task Force, a group comprised of representatives from several state agencies, business representatives, academics, health care professionals, and the environmental community, has been the focus of much of Michigan's mercury pollution prevention efforts. In 1993, the Michigan Environmental Science Board concluded that steps needed to be taken to reduce the environmental threat posed by mercury contamination. The threat of EPA regulation, particularly with respect to coal combustion and medical waste incineration, further served to generate interest in achieving voluntary reductions. As a result, Michigan has sponsored a number of successful voluntary programs with sectors known to use mercury in their processes, activities, or services. Programs have ranged from collecting bulk mercury to inducing the phase out of the use of mercury switches in Chrysler, Ford, and General Motors vehicles.

The Detroit Water and Sewerage Department, in partnership with MDEQ, the National Wildlife Federation, BFI, and EPA, found that dental offices stockpiled a large quantity of elemental bulk mercury. From January to June 1996, the Department offered dental offices free collection and disposal of mercury as a means of reducing potential discharges to the collection system. A total of 1,300 pounds (from more than 400 dentists) was collected as part of this program. Additional targeted mercury collection programs have also been sponsored, including two collection days in the Saginaw Bay Watershed, which netted 200 pounds of mercury for disposal.[8] Other programs include training health care professionals in reducing mercury usage at hospitals and medical laboratories.

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[8] Mercury emissions from Michigan's two largest utilities, Detroit Edison and Consumers Power, were reported to be 1,750 and 878 pounds per year, respectively, in 1995. Taken from Michigan's Mercury Action Plan Progress Report, October 1996, p. 6.

Sector-Specific Programs

The Great Printers Project, jointly sponsored by the Environmental Defense Fund, The Council of Great Lakes Governors, and the Printing Industries of America, seeks to spread pollution prevention techniques within the printing industry. In Michigan, MDEQ's partners include the Michigan Environmental Council and the Printers Industry of Michigan. Incentives for participation include cleaner production techniques, reduced waste generation costs, and regulatory cost avoidance by minimizing/eliminating the use of volatile organic compounds. Additionally, the project seeks to reduce regulatory red tape by developing a consolidated reporting system in the States of Illinois, Michigan, Minnesota, and Wisconsin. A tremendous outreach effort is being mounted to demonstrate methods for waste and cost reduction, and efforts are being made to increase the competitive advantage of shops achieving "Great Printer" status by, for example, providing greater access to government printing contracts. To increase the number of case studies available to project sponsors and participants, as well as to provide a mechanism for measuring programmatic success and public support, printers are required to report on their progress in achieving goals.

Eligibility factors for attaining the status of a Great Printer include complying with environmental regulations, achieving beyond compliance objects by employing environmentally sound practices, and seeking continuous improvement of environmental performance through periodic assessments

The Great Printers Project uses every available means of outreach and technical assistance to generate interest in the project. In addition to a general explanation of the program's goals and purposes, for example, Michigan supplies printers with an introductory guide to hazardous waste generation responsibilities to make them aware of the regulatory costs of waste generation, as well as a checklist of pollution prevention opportunities. Consistent with Illinois and Ontario projects that emphasize generating increased participation rates through peer networks, the Great Printers Project emphasizes the importance of "printers helping printers." The Printers National Environmental Assistance Center enables printers to obtain pollution prevention technical assistance from other printers, as well as from print industry vendors, using a multi-accessible telecommunications-based center.

While the Great Printers Project does not target any particular pollutants, the emphasis on production lines where economic savings can be expected (e.g., silver recovery, VOC reductions) tends to isolate particular reduction techniques and pollutant reductions.

When working with organizations with greater internal EH&S resources, such as the automobile and pulp and paper industries, Michigan staff adopt different goals for advancing beyond compliance objectives. For example, the goals of the Automobile Pollution Prevention Project (APPP) focus on broader, longer-term issues, including identifying persistent toxic substances in the automobile industry, advancing pollution prevention through the supplier base, and jointly discussing regulatory barriers that could inhibit further reductions. EC and OMEE are following a similar course through the Canadian Auto Project. Michigan's project requires the state and auto companies to define a targeted list of toxic substances, termed Great Lakes Persistent Toxic (GLPT) substances, and then report on the reduction of those substances as well as other substances. As a result of the APPP, Chrysler, Ford, and General Motors will phase out 9.8 metric tons of mercury used annually for hood and trunk convenience lighting. Additionally, the auto companies develop and disseminate pollution prevention case studies and have adopted an active program for disseminating success stories to suppliers, including approaches for reducing GLPTs. For example, APPP project participants disseminated more than 5,000 copies of case studies to suppliers and have coordinated actions with the Canadian Auto Project.

The Michigan Pulp and Paper Environmental Council (MPPEC), Michigan's Department of Environmental Quality (MDEQ), and EPA are sponsoring an environmental stewardship initiative specific to pulp and paper facilities. Participation in the Pulp and Paper Pollution Prevention Program, known as P5, is open to any Michigan pulp and paper facility. To be eligible for admittance into P5, facilities must provide an initial statement of pollution prevention commitment, demonstrate the existence of a written pollution prevention philosophy, establish facility-specific goals, agree to recordkeeping and reporting on pollution prevention activities, and agree to participate in technology transfer efforts to share success stories in the form of case studies.

Under this program, MDEQ worked with MPPEC to establish a list of pollutants, which included bioaccumulative pollutants, for the mills to consider in developing their pollution prevention goal statements. The mills have chosen the pollution prevention goals that are most pressing at their individual mills. Based on what the participating mills ultimately choose as their goals, industry-wide P5 goals for reduction will be identified. Therefore, quantitative reductions for bioaccumulative pollutants of concern will only become part of the industry's pollution prevention goals if the mills choose them as goals initially.

Non-Regulatory Messengers

Similar to EC/OMEE funding of private organizations to conduct waste reduction assessments, Michigan offers technical assistance through retirees. The Retired Engineer Technical

Assistance Program (RETAP), a non-profit effort that involves retired engineers, scientists, and other professionals, is funded by Michigan and EPA, and assists Michigan businesses with waste reduction by providing free, confidential waste reduction assessments. The resulting reports identify specific recommendations for saving money. While facilities are not obligated to implement any of the recommendations, experience has shown that sufficient financial and environmental incentives exist for the facility to follow up on recommendations.

Michigan Business Pollution Prevention Partnership

The Michigan Business Pollution Prevention Partnership (MBP3), was recently initiated. To become part of the MBP3, an organization signs a pledge agreeing to commit to waste prevention and reduction goals and the preparation of a progress report one year after the facility submits its goals. The progress report shares success stories on pollution prevention opportunities implemented. To attract participants, literature advertises sponsors, including a wide variety of trade associations (e.g., Michigan Grocers Associations, American Automobile Manufacturers Association, and Michigan Chemical Council) and individual companies (e.g., Chrysler, Amway, BASF, and Detroit Edison). As a result of certification, recruits earn a Certificate of Participation and, upon receipt of an annual report and commitment renewal, a Certificate of Achievement. The MBP3 is an umbrella program, and organizations participating in sector-specific programs, some of which were described above, are eligible for participation in the MBP3. The program is not targeted at the reduction of any specific substances.

3.2 SUMMARY OF VOLUNTARY, BEYOND COMPLIANCE PROGRAMS IN WHICH GOVERNMENT SPONSORS OFFER REGULATORY/ ADMINISTRATIVE FLEXIBILITY TO PARTICIPANTS

Although federal, state, and provincial regulations have resulted in substantial environmental improvement, regulatory programs can create disincentives that can deter achievement of superior environmental performance. This section reviews activities underway or being contemplated that involve offering regulatory/administrative flexibility as a means of stimulating improvements in environmental performance.

3.2.1 The Role of Enforcement Discretion in Stimulating Beyond Compliance Behavior

Over the last year, the State of Illinois sponsored a pilot program, known as "Clean Break," to improve the environmental performance of small businesses (less than 200 employees) in the autobody/auto repair and printing sectors. The program has now been expanded Statewide, with no specified sector targets. The State offers interested parties a multimedia audit of their place

of business and a commitment not to refer any violations, provided that the business participates productively in Clean Break.

Interested businesses contact IEPA. Once contacted, IEPA provides a Client Account Manager trained to assist businesses within the prospective client's sector. The initial meeting can take place anonymously (in person or by telephone) or can proceed, should the client choose, directly to a compliance assistance visit. During a visit, the IEPA Client Account Manager conducts a compliance and waste reduction audit of the business. The small business then has the opportunity to develop an amnesty/compliance agreement with IEPA, in which the business agrees to achieve compliance within a reasonable timeframe and IEPA, as a result of the agreement, agrees to forego an enforcement referral. Upon achievement of the requirements of the agreement, IEPA issues a Clean Break Certificate to the participant. Note that this program is primarily directed at improving compliance; relatively less effort is spent in identifying beyond compliance opportunities.

Most participants were "good actors," and no significant environmental violations were documented as a result of the program. IEPA improved its image with participating smaller businesses and established a good rapport that might facilitate future outreach efforts.

3.2.2 The Role of Experimental Pilot Programs in Stimulating Beyond Compliance Behavior

In June 1996, IEPA authorizing legislation was amended to create the Environmental Management System Agreement (EMSA) Program. The legislation authorizes IEPA to establish case-specific agreements with environmental innovators; enabling them to implement innovative procedures for enhancing environmental performance in exchange for administrative flexibility. IEPA regulators believe that providing a statutory, regulatory, and policy framework for EMSA is a key prerequisite for ensuring program success.

IEPA wants to charter between 15 and 25 pilot projects, expecting that together the projects can offer a wide range of innovative regulatory experiments that (1) achieve "beyond compliance" release reductions and/or (2) achieve risk reductions or foster environmental compliance by other regulated parties in a manner superior to the existing regulatory system. Projects can be site-specific or company-wide and

IEPA's Key Characteristics of EMS

1. Emphasis on actual environmental performance using a continuous improvement cycle
2. Focus on integration and use of pollution prevention as the preferred method for achieving environmental protection
3. Commitment to compliance assurance
4. Extensive stakeholder involvement

can involve one or more environmental media. While the program guidance suggests that a principal aim of the project is to promote environmental management systems as a pathway to enhanced environmental performance, IEPA guidance holds that "...the proposed regulatory innovations' most important ingredient is the desire of a regulated entity to charter its own course for environmental progress and to be fully accountable for its performance."[9] IEPA expects to attract participants by offering reforms of state and federal authority, although any flexibility of federal requirements will need to be accomplished in concert with Project XL. As a result of problems that EPA has experienced in successfully coming to terms with organizations interested in Project XL, there are serious questions about whether IEPA can provide enough administrative/regulatory flexibility within its own authority to attract participants. Consequently, IEPA recognizes that its ability to attract program participants is somewhat dampened because federally applicable requirements cannot be modified without the facility's participation in Project XL.

The EMSA Program has been developed to limit the transaction costs associated with project design. Interested parties are encouraged to submit a letter of intent prior to preparing a formal application, so that IEPA and the applicant can assess the project's workability upfront, easing the application phase. Upon receipt and review of the applicant's proposal, IEPA will notify the public of each pilot project. The public participation period must be completed prior to IEPA's entry into the EMS Agreement.

Michigan is in the process of establishing a beyond compliance program, the Clean Corporate Citizen (C3) Program, based on the principle that facilities that have consistently developed a strong environmental ethic can be relied upon to achieve environmental excellence without rigorous regulatory oversight. This program rewards environmental excellence by providing permitting flexibility to successful applicants.

To be eligible, organizations (including companies, municipalities, and institutions) must demonstrate three criteria:

1. ***Strong, in-place environmental management system***—Provide for identification of environmental impacts, self-initiated compliance audits, public participation, a strong and clear statement of the company's commitment to environmental excellence, and environmental training for employees, among other activities.

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[9] Draft Program Guidance Document for Participation in Pilot Program for EMS Agreements, prepared by Illinois EPA, October 1996, p. 6.

2. ***Pollution Prevention***—Commit to reducing waste generation at the source, including undertaking actions to identify pollution prevention opportunities, establish goals to address opportunities, report accomplishments, and participate in information and technical exchange programs. Participation in a pre-existing MDEQ-sponsored pollution prevention program satisfies this criterion.

3. ***Environmental Compliance***—Demonstrate consistent compliance with all applicable requirements and have no unresolved violations.

Initially, the C3 Program will be introduced in the air program, with expansion to the water and waste programs expected in the near future. The benefits of participation in the C3 Program with respect to Clean Air Act requirements will include the following:

- ***An Expanded Waiver Provision***—The current waiver provision allows companies to begin construction of a facility or process while their air use construction permit is under review. The company must first demonstrate that the new process is critical and that a hardship would result if the waiver was not granted. The waiver provision will allow C3 facilities to begin construction and operation while their application is under review, without showing that a hardship would result if the waiver was not granted.

- ***Expedited Permit Application Review***—The program would assure that MDEQ processes a permit application in a timely fashion. The program would require MDEQ to issue/deny a permit within 30 days of receiving a complete application by a C3 facility. (Additional time is necessary if a public hearing is required on the proposed permit.)

- ***Plant-wide Applicability Limit (PAL)***—This would establish an emissions cap for the C3 facility. Under a PAL permit, a C3 facility would not be required to obtain construction permits for new processes, as long as the emissions for the entire facility stayed below the established emissions cap. A PAL permit would require the C3 facility to monitor and keep records to verify that compliance with the PAL was being achieved.

As with other regulatory flexibility projects, the need for public review is recognized. As a first step in the C3 designation process, the facility would be required to notify the public, and provide a forum for public review of the completed application and supporting material. Following public review, the application and supporting documentation would be submitted to MDEQ for review and subsequent approval or denial of C3 designation. The C3 designation would have to be renewed annually, and the designation could be lost if MDEQ determines that the criteria have not been met.

3.2.3 The Role of Market-Based Programs in Stimulating Beyond Compliance Behavior

> According to the Northeast States for Coordinated Air Use Management, a 50-percent or greater savings can be realized for sources using emission reduction credits (ERCs).

Market-based trading programs have captured the imagination of corporate EH&S officials, largely as a result of the success of the sulfur dioxide emissions trading program. EH&S officials interviewed as part of the earlier referenced GEMI report identified three factors that led to their participation in the emissions trading program: (1) participation reduced costs, (2) compliance was flexible, and (3) some companies were able to sell credits.[10] The Clean Air Act Amendments of 1990 encourage the use of market-based approaches, including emissions trading, to assist in attaining National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. Both Illinois and Michigan have embarked on developing emissions trading programs for VOCs and particulate matter. The following discussion describes some of the salient points of Michigan's proposed emissions trading program as a conceptual base for the use of trading as a means of reducing loadings of persistent toxics in the Great Lakes basin. As currently structured, Michigan's program specifically prohibits the use of emission reduction credits (ERCs) or emission averaging for 14 persistent toxics. Indeed, recognizing that an emission trade for VOCs or particulates could result in a source increasing emissions of a persistent toxics, the program specifically prohibits trading or averaging that would result in the increase of a maximum hourly emission of any toxic air contaminants, unless it can be demonstrated that the increased rate would not cause or contribute to the exceedance of health-based screening level. Nonetheless, a short explanation of Michigan's air emission trading program is instructive.

Michigan adopted a voluntary statewide air emission trading program in March 1996. The program is designed to improve air quality by optimizing the cost of emission reductions through a system of market-based incentives. As explained in DEQ's Air Emission Trading Program Fact Sheet, there are two types of emission trading systems: open and closed.[11] An open system is voluntary and provides for trading of all potential sources, including stationary, area, and mobile sources. An emission reduction credit (ERC) is generated when a facility reduces emissions beyond current regulatory requirements. Michigan defines an ERC as one ton of reduction.

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[10] Corporate Environmental Health and Safety Practices in Transition: Management System Responses to Changing Public Expectations, Regulatory Requirements, and Incentives, prepared by Terry F. Yosie and Timothy D. Herbst, E. Bruce Harrison/Rudder Finn, Inc., for the Global Environmental Management Initiative, p. 31.

[11] Fact Sheet: Air Emission Trading Program, Michigan Department of Environmental Quality, Environmental Assistance Division.

Environmental benefit accrues as a result of the trading system. Ten percent of all ERCs are retired by MDEQ, thereby resulting in statewide loading reductions. ERC can be used to comply with emission requirements at the same or other sources, or "banked" for future use. Banking for future use sets the open system apart from closed systems. It should be noted that EPA has recently indicated its unwillingness to approve Michigan's "open" trading program.

Michigan's program also provides for emission averaging, in which a reduction at a source(s) can be used to compensate for an increase at another source(s), assuming the facility is within the same source category and is owned by the same entity. As a function of this additional flexibility, Michigan will retain 10 percent of the total number of ERCs traded to benefit environmental improvement.

Closed emission trading systems limit trading to major sources. Closed systems are mandatory and require a complete emission inventory for the prescribed geographic area. Emission rates are capped, with portions of the cap allocated to affected sources based on historical operations. Sources may sell or trade their excess allocations to sources that emit more than their annual allocation.

EPA Region 5 recently funded the State of Minnesota to evaluate the possibility of developing a mercury control strategy based on a trading system. Under the system now being conceptualized, the state would establish a cap of the amount of releases from all quantifiable sources and reduce the cap over time.

3.3 SUMMARY OF INCENTIVES USED BY VOLUNTARY, BEYOND COMPLIANCE PROGRAM MANAGERS

This section summarizes the approaches used by the national, state, and provincial governments to create incentives for organizations to participate in voluntary, beyond compliance programs.

3.3.1 Gaining the Audience's Initial Attention

Oftentimes, program officials generate initial interest in voluntary, beyond compliance programs by sensitizing the potential audience to the public's general concerns with regard to pollution or a specific pollutant or set of pollutants. In some cases, the initial message can be delivered by government officials, such as with the 33/50 Program, and in other cases by a coalition of concerned organizations, as was accomplished by the Michigan Environmental Science Board (MESB).

The State of Michigan found that corporate officials will actively participate in voluntary, beyond compliance programs to reduce persistent toxic loadings when there is sufficient information, prominently discussed in academic, policy, and scientific circles, that the contaminant is of concern. Michigan's Governor Engler chartered the MESB to prepare a background report on mercury's disposition in the Michigan environment. This report, and a flurry of related press releases and informational packets, raised public concerns about mercury contamination and its potential human health impacts. As a result of the report, and the threat of regulation, the State has been able to attract a wide variety of stakeholders, including hospitals and automotive companies, to take part in voluntary, beyond compliance programs directed at mercury reduction. MDEQ has seen real benefits, including raising the profile of mercury releases as an aspect of automobile manufacturing that merits the attention of corporate executives.

The threat of regulation has been used to foster voluntary participation. The threat of EPA regulation of medical waste combustors has acted as an incentive for hospital administrators to work with environmental officials to identify and reduce mercury and other emissions. Conversely, as described by EC officials, the opportunity for widespread use of wet cleaning operations throughout Ontario slowed when the threat of regulation dissipated (Note: EC is now considering regulation as described in Section 3.1.2). Similarly, EC saw a potential agreement with the food processing industry dissipate when the threat of regulation was removed.

3.3.2 Providing Technical Assistance to Motivate Action

Managers and staff in all jurisdictions recognized that programs that offered clients quick, well-understood economic benefits at a marginal investment, such as the Green Lights program, were easy "sells." They also recognized that marketing material documenting cost savings was essential and that case studies documenting the cost savings of peers proved most useful.

All of the jurisdictions engage in developing technical assistance literature that advances the concept that waste is a design defect in production processes and that cost savings can be realized by reducing waste generation. The jurisdictions also demonstrate that other business benefits accrue from adopting beyond compliance control techniques. For example, EC and OMEE determined that the financial sector (banks and insurers) valued pollution prevention practices put in place by automobile body shop and metal finishing clients and rewarded clients with lower insurance premiums and quicker processing of loan applications.

3.3.3 Selecting the Messenger to Deliver Technical Assistance

To reach small and medium-sized organizations, program officials often need to turn to surrogate messengers to sharpen the message's credibility and speed acceptance throughout the industrial community. IEPA, for example, uses other state agencies, graduate students, and attorneys and accountants as change agents. In Ontario, EC and OMEE emphasize the use of trade associations and facility-specific case studies to effectuate change. MDEQ supplements its beyond compliance message delivery system by using trade associations and skilled retirees. Non-government organizations, including the Environmental Defense Fund, have also recognized the need to establish coalitions with trade associations, per the Great Printers Project, to further their beyond compliance message.

In addition, pressure can be applied through the supply and distribution chain. Particularly in Ontario and Michigan, where the automobile industry represents from 25 to 35 percent of economic activity, program officials have successfully spurred voluntary, beyond compliance programs at smaller facilities by working with the Big Three. ISO 14000 could play a large role in facilitating change through the supply chain in years to come.

3.3.4 Providing Regulatory/Administrative Flexibility to Lure Additional Recruits

Many organizations have already taken major steps to reduce environmental pollution, including persistent toxics, as a result of the TQM/pollution prevention convergence. To attract these organizations to commit to further, more difficult reductions, program managers will need to provide corporate EH&S staff with the tools to demonstrate that environmental improvements can lead to gains in productivity, market share, and profitability.

Many of the costs associated with environmental regulation have been tagged "transaction costs," generally associated with reporting and recordkeeping. The States of Illinois and Michigan have recognized the need to fashion new incentives for organizations that have achieved superior environmental programs by adopting programs that offer regulatory flexibility in exchange for improved environmental performance. These programs can offer real value to corporate planners, especially those corporations where bringing new products to market in rapid fashion is an important aspect of capturing market share and increasing profitability.

3.3.5 Progress Reports

The jurisdictions have recognized the need to receive progress reports from project participants. Ontario officials believe that public reporting and information sharing are the "most critical" element of their pollution prevention partnerships. In some cases, the major reason for receiving progress reports is to generate case studies, which can then be used in recruiting additional participants. Some of the programs have proven successful in developing case studies, others have not. In still other cases, the major reason for developing progress reports is to provide the public with assurances that these beyond compliance programs, funded by public dollars, are yielding benefits. In particular, beyond compliance programs that offer regulatory breaks must be sensitive to the need for progress reports to ensure the regulatory authority and the public that benefits received are commensurate with the flexibility provided. Thus, the Illinois and Michigan programs offering regulatory flexibility both require progress reports and, to further assure the public, open public review of proposed goals, objectives, and measures of success.

4. RECOMMENDATIONS

Both general and specific recommendations were developed as a the result of the interview process. This section provides general recommendations for establishing voluntary, beyond compliance programs targeted at the persistent toxics and more specific recommendations for sharpening the focus of specific, in-place beyond compliance programs on the persistent toxics of concern.

4.1 GENERAL RECOMMENDATIONS

This section provides general recommendations for establishing voluntary, beyond compliance programs targeted at the Level I and II persistent toxics of concern.

4.1.1 Gaining the Audience's Initial Interest

The Binational Virtual Elimination Strategy is the culmination of prior steps taken by the Parties/Jurisdictions to reduce the generation and release of the persistent toxics to the Great Lakes system. The Strategy represents an important commitment by the Parties/Jurisdictions to protect the Great Lakes and needs to be announced with sufficient vigor, including press releases, scientific papers, conferences, etc., to capture the attention and interest of potential voluntary, beyond compliance program participants.

The practical reason for such an investment is that, just as during the late 1980s when the TQM philosophy captured corporate interest, there is another management science philosophy by-product that has captured corporate interest and can be used by program managers. Once again, Great Lakes environmental program managers have been afforded the opportunity to use corporate management philosophy to forward reduction goals. ISO 14000, which establishes a management process for achieving environmental excellence, ties a commitment to environmental management systems with market objectives. Organizations that receive ISO 14000 certification may find that achieving certification opens markets that might otherwise be closed.

The linchpin of ISO 14000 is the organization's initial identification of "significant environmental aspects." Again, ISO 14000 is a process. In itself, it does <u>not</u> prescribe environmental performance criteria. Organizations are encouraged to conduct environmental planning including a "review" to assess the significant environmental aspects of "current and relevant past activities, products and services." The review is to encompass examining legislative/regulatory requirements, an evaluation of feedback from the investigation of previous incidents, and an examination of existing environmental management practices. The review may

also involve industry codes of practice, agreements with public authorities, and non-regulatory guidelines. The IJC, nations, states, and provinces should work to ensure that organizations interested in pursuing ISO 14000 certification consider persistent toxics in evaluating what constitutes the "significant environmental aspects" of their activities, products, and services. For example, large manufacturers might be encouraged to develop design for the environment (DfE) programs directed at substituting new materials for one or more persistent toxics currently used in their products, activities, or services.

4.1.2 Providing Technical Assistance to Motivate Action

To the extent possible, the IJC, nations, states, and provinces should inventory the economic activities, processes, and services that generate the persistent toxics of concern. For example, EPA Region 5 worked to identify the sources of mercury in medical waste, which enabled the states to work with professionals in the medical community to identify product alternatives, as well as safe disposal practices. Building on the work of Minnesota, Michigan utilizes a mercury use tree that identified all known uses of mercury. These use trees, completed for each persistent toxic of concern, can then be used as the focal point for clarifying the sectors of concern, the incentives applicable to each sector, and the generation of a technical assistance plan, which might include literature, help-lines, and onsite waste reduction assessments.

Sector-specific use trees should be disseminated widely and discussed, so that organizations considering ISO 14000 certification cannot possibly miss the significance of this aspect of their activities. Although not all organizations are likely to seek ISO 14000 certification, those that will seek ISO certification can send "ripple effects" through the economy by virtue of the size of these organizations. The IJC and/or Parties/Jurisdictions should consider convening stakeholder meetings to identify opportunities for including reduction of persistent toxics in environmental management systems.

4.1.3 Selecting the Messenger

As demonstrated throughout this report, program managers generally have adopted delivery mechanisms that make use of both government and non-government messengers. It appears that government program managers are most effective in working with larger organizations. In working with small to mid-sized organizations, however, it is best to use intermediaries as the initial and principal messenger.

As noted previously, a key principle of the ISO 14000 guidelines is that a certified organization is to encourage contractors and suppliers to adopt an EMS program. If the nations, provinces,

and states are successful in sending a message about the importance of reducing the toxics of concern to corporate EH&S managers, the potential for action through ISO 14000 is significant. Recently, Ford Motor Company announced that it expects to have 150 of their facilities certified to ISO 14001 specifications by the end of 1998. Graham Chatburn, EMS Manager in Ford Motor Company's Environmental Quality Division, noted that Ford "... will encourage our suppliers to follow our lead."[12]

Even if ISO can drive supplier interest in reductions, many of the smaller to mid-sized organizations will still need assistance in defining source reduction opportunities. Moreover, as noted throughout the interview week, organizations should not be deterred from identifying and implementing source reduction programs directed at pollutants other than those identified as Levels I and II. Consequently, technical assistance personnel knowledgeable about sector-specific processes, whether they be trade association personnel, peers, retirees, or graduate students, need be made available to identify cost-effective actions.

4.1.4 Providing Regulatory/Administrative Flexibility

Upon review of the persistent toxic use trees, program managers will be better able position to assess the need to remove regulatory barriers as a means of establishing incentives for reductions of targeted toxics. In all likelihood, some action in this area will be necessary. Additionally, to the degree that calls for future regulation are muted, providing regulatory flexibility as a means of building incentives will gain importance.

As the IJC and Parties/Jurisdictions consider the proportional effect of the air pathway on the health of the Great Lakes ecosystem, as well as the effect of historic contamination (e.g., in-place sediment contamination), the potential opportunities that cross-plant, cross-media trades may yield needs to be considered. This is particularly true where the marginal costs of controlling the toxic of concern varies widely from source-to-source. Additionally, given that a large number of Level I and II substances are no longer in use suggests that these may be opportunities for developing a market where active facilities fund actions (e.g., fund household collection efforts directed at pesticide disposal) in return for extensions on compliance deadlines or other flexibility that can be afforded.

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[12] *The ISO Edge*, Volume 1, Issue 4, Fall 1996.

4.1.5 Progress Reports

To date, beyond compliance programs have stressed progress reports as a means of generating case studies in part to encourage additional participation. While this has tremendous merit, particularly as a technology transfer approach, and the jurisdictions have published reports on reductions achieved as a result of some beyond compliance initiatives, more attention needs to be placed on identifying the reductions, and the program-specific goals that can reasonably be expected to be achieved within prescribed timeframes.

Although some facilities may not participate as a result of reporting requirements, program managers need to establish reporting requirements as a program eligibility requirement to the maximum extent feasible.

At the same time, it is incumbent upon program managers to develop current loading estimates of releases of persistent toxics in the Great Lakes system. These estimates will provide a baseline for measuring reductions.

4.2 SPECIFIC RECOMMENDATIONS

This section provides specific recommendations on the programs, identified during the interviews that could be modified to target Level I and II persistent toxics. **Exhibit 2** provides an incomplete listing of the uses of these substances. As shown in Exhibit 2, many of these substances have been banned, restricted, or discontinued voluntarily.

4.2.1 Attracting Recruits

To the extent that any of the broad-scale programs can be used to attract participants interested in reducing the persistent toxics, such an attempt should be made. For example, the Illinois Clean Break Program was recently expanded so that any small business (less than 200 employees) is now eligible for program participation. While broad-scale availability has its benefits, Illinois might consider developing sector-specific campaigns, working with trade associations, etc., to attract participants in economic sectors that use the persistent toxics in production processes, services, or activities. Since the value of the Clean Break Program is largely related to the expertise of the Client Account Managers, any sector-specific campaign should be preceded by assuring an adequate number of knowledgeable Client Account Managers. Additionally, to the extent successful results accrue, technical transfer literature describing that successes should be prepared and disseminated widely.

Exhibit 2: Level I Substances and Uses

Substance	Use
Aldrin/Dieldrin	All uses of aldrin have been canceled in the United States. All uses of dieldrin, with exceptions of termite control and dipping of nonfood roots and tops, were banned in 1985. These uses have been voluntarily canceled by industry.
Benzo(a)pyrene	A polyaromatic hydrocarbon (PAH). Produced during iron and steel industry operations, and during heating and power generation. Component of crude and refined petroleum and coal. Accidental releases account for elevated PAHs in aquatic systems.
Chlordane	Only commercial use is for fire ant control in power stations.
DDT (DDE/DDD)	DDT, and metabolites DDD and DDEs, have been canceled since early 1970s.
Hexachlorobenzene	Formerly used as a seed fungicide and wood preservative. HCB is a by-product of the production of several industrial chemicals, and is emitted via waste incineration, including incineration of municipal wastes. Also formed during chlorination treatment of process water and wastewater. Commercial production of HCB was discontinued in 1976.
Alkyl-lead	Used as an anti-knock agents in aviation gasoline.
Mercury and mercury compounds	Occurs naturally in coal and mineral ores. Used in battery cells, barometers, thermometers, switches, and fluorescent lamps. In general, pesticides containing mercury have been canceled, although a few fungicide uses are permitted.
Mirex	Was widely used to eradicate fire ants. Under the name declorane, used as a fire-retardant plastics additive. All mirex-containing products have been canceled, though existing stocks of Harvester Bait 300 may be sold and used for ant control subject to stringent restrictions.
Octachlorostyrene	Formed as a waste from the production of chlorine prior to 1970.
PCBs	Once widely used in a variety of products. EPA banned the use of PCBs except in totally enclosed systems in 1979. In 1982, regulations were revised to restrict uses of PCBs in electrical equipment. In limited-access areas, PCB transformers and large capacitors can be used until equipment wears out.
Dioxins and Furans	Dioxin and related compounds are formed as unwanted impurities during the manufacture of other organic compounds, including herbicides. Dioxins can be generated as a by-product of paper and pulp mill bleaching processes using chlorine. EPA has required manufacturers to reduce concentrations of TCDD in chemical products.
Toxaphene	Insecticide for the protection of cotton and food crops. All uses of toxaphene products has been canceled.

Exhibit 2: Level II Substances and Uses*

Substance	Use
4-bromophenol phenyl ether	Research chemical formerly used as a flame retardant additive to polymers.
cadmium and cadmium compounds	Cadmium is electrodeposited and dipped coating on metals, bearings and low-melting alloys, brazing alloys, fire protection systems, nickel-cadmium storage batteries, power transmission wire, TV phosphors, basis of pigments used in ceramic glazes, machinery enamels, baking enamels, photography and lithography, electrodes for cadmium-vapor lamps and photoelectric cells. Cadmium acetate is used in ceramics, manufacture of acetates, assistant in dyeing and printing textiles, electroplating baths. Cadmium bromide is used in photography, process engraving, lithography. Cadmium chloride is used in photography, dyeing and calico printing, electroplating baths, manufacture of special mirrors. Cadmium iodide is used in photography, process engraving and lithography, electroplating. Other cadmium compounds are similarly listed.
1,4-dichlorobenzene	Moth repellant, general insecticide, dyes, intermediates, pharmacy, agriculture (fumigating soil)
3,3'-dichlorobenzidine	Used as an intermediate for dyes and pigments and as a curing agent for isocyanate-terminated resins for urethane plastics.
dinitropyrene	No uses found in texts consulted.
endrin	Endrin is a organochlorine pesticide, largely restricted by 1979. In 1984, sole producer voluntarily requested cancellation of registration of all endrin products
heptachlor	The only commercial use still permitted is for fire ant control in power transformers. No uses are allowed in MN and NY.
hexachlorobutadiene	Several industrial uses, including use as a solvent for elastomers and natural and synthetic rubber; a heat transfer liquid; a transformer and hydraulic fluid; and a fumigant for grapes.
hexachlorocyclohexane	Used as an insecticide on a variety of fruit and vegetable crops, ornamentals, and tobacco. Used in forestry, by homeowners, and in commercial warehouses or feed storage areas, farm animal premises, and wooden structures.
4,4'-methylenebis	Oxidation inhibitor and antiwear agent for motor oils, aviation piston engine oils, industrial oils, antioxidant for rubbers, resins, and adhesives.
methoxychlor	Hundreds of products containing methoxychlor are registered for agricultural insect control. Methoxychlor is used to control insects in areas such as hotels, bakeries, meat processing plants, flour mills, dairy barns, stagnant ponds, streams, and aquatic recreation areas.
pentachlorobenzene	An impurity found in the soil fungicide pentachloronitrobenzene. Used in chemical research and organic synthesis. Also in manufacture of pentachloronitrobenzene.
tetrachlorobenzene	1,2,3,4-TCB is used as a component of dielectric fluids and in chemical synthesis. 1,2,4,5-TCB is used in the production of herbicide 2,4,5-T, a component of Agent Orange. It has also been used as an insecticide, for electrical insulations, and as an impregnant for moisture resistance.
pentachlorophenol	Fungicide, bactericide, algicide, herbicide, wood preservative (telephone poles, pilings, etc.).
tributyl tin	Found in forms as an acetate, chloride, and oxide. Used as a fungicide and bactericide (acetate); rodenticide, intermediate, rodent-repellent cable coatings (chloride); and bactericide, fungicide, intermediate (oxide).

*Level II also addresses PAHs, including anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, perylene, and phenanthrene.

Michigan and Ontario have an opportunity to attract recruits by working closely with the automobile industry. In working with Michigan to identify GLPTs, the industry has already signaled that it is open to identifying and reducing contaminants of concern. Ford has announced its intent to seek ISO 14000 certification, and other manufacturers may follow the lead. The jurisdictions could use the "supply chain" to encourage small and mid-sized organizations to achieve beyond compliance reductions of Level I and II toxic substances. Some persistent substances, such as cadmium and cadmium compounds, may be targeted for reduction.

> Regulatory requirements, costly cleanups, risks associated with the potential for business interruption, and the company's commitment to lead as a corporate citizen, led Ford to decide to phase out PCB transformers company-wide. In 1994, as part of Ford's corporate manufacturing strategy, it was agreed that all remaining PCB transformers and electrical equipment would be replaced with non-PCB systems by 2010. This phase-out program, launched in September 1995, resulted in the elimination of 37 transformers in 1995.

Michigan's mercury collection programs, both in Detroit and Saginaw, proved to be very successful. Well-publicized, directed collection programs may be appropriate for certain persistent toxics, particularly pesticides formerly used by farm cooperatives, food distributors, etc.

The States of Michigan and Illinois have demonstrated that their support for beyond compliance reductions encompasses offering regulatory flexibility to organizations committed to environmental excellence. The states could actively recruit organizations releasing persistent toxics into these regulatory flexibility programs, with the proviso that their continued quality improvement efforts stress a commitment to reducing the persistent toxics of concern.

4.2.2 Content of Technical Assistance

It is recommended that the jurisdictions develop marketing packages identifying source reduction alternatives for specific processes and activities, much like the literature that was developed for hospitals and printers. The Parties/Jurisdictions could realize cost savings by together developing this literature. If sufficient case studies are not available, a technical program might be required to develop case studies. This can be accomplished by recruiting trade associations and/or visionary organizations as test cases to assist in case study development. For example, case studies on cadmium reduction could be developed as part of the Great Printers project. Additionally, the Michigan Automobile Pollution Prevention Project demonstrates that the automobile companies are open to disseminating case studies to suppliers. Perhaps the next stage of the project could involve development and dissemination of case studies with direct

application to the contaminants of concern, such as pollution prevention opportunities directed at PAH and cadmium reduction.

Many of the beyond compliance programs require a progress report as a precondition of participation. In some cases, however, program managers and participants have not placed sufficient emphasis on using this programmatic requirement. For example, the Illinois Partners in P2 Program has not resulted in the development of well-written case studies. And, it remains to be seen whether participants in other programs, now in their initial stages, will invest sufficient time into the reporting requirement to generate valuable case studies. Program managers should clarify the importance of the progress reporting requirement to participants as a precondition of their initial application. Providing a format for case studies and examples could stimulate the development of quality case studies. The importance of this requirement should be particularly stressed in dealing with larger organizations, because they are more likely to have sufficient resources to develop well-written progress reports. In addition, program managers should consider reprimanding organizations that fail to meet expectations (e.g., announce removal of their status as a "green company").

4.2.3 Delivery of Technical Assistance

Marketing material must be delivered by a credible messenger. Although regulatory agency personnel may have credibility with some organizations, using regulatory personnel as the primary messenger may deter participation of organizations most in need of environmental improvement. For example, the pilot Clean Break program tended to attract "good actors," and even these organizations waited, in large part, until the last month of the program to come forward and ask assistance of IEPA.

Because program managers recognize that the best messengers have instant credibility with the organizations, peers are used extensively. However, since peers have other responsibilities and disseminating information is not their primary mission, program managers rely on other technical assistance personnel to provide support and build momentum. EC and OMEE's support for a "circuit riding" technical expert within a trade association was an effective means of ensuring the availability of a full-time technical expert to trade associations representing small and medium-sized industries. Other sources of circuit riders could include local, state/provincial, and national economic development organizations. For example, in the United States the Commerce Department's National Institute of Science and Technology (NIST) offers technical assistance, including expertise in environmental controls, through the Manufacturing Extension Program (MEP).

Providing hands-on technical assistance is expensive. Consequently, when program managers offer such assistance, a large return should be expected. OMEE provides a contractor to facilities interested in having a waste reduction audit conducted and provides a cost-share arrangement. Perhaps cost shares could be provided on a preferential basis, where facilities interested in reducing persistent toxics receive first priority. Additionally, perhaps OMEE could pay a higher percentage of the costs to facilities implementing actions to reduce persistent toxic releases.

IEPA's graduate assistant program is small, but it can be used to generate recruits with an interest in reducing persistent toxics. IEPA could structure its grant program to reserve some proportion of total awards to facilities interested in reducing targeted contaminants, or the State could award more support, via more student assistants or a longer time period, to facilities seeking pollution prevention opportunities for targeted contaminants.

4.2.4 Programs Offering Regulatory/Administrative Flexibility

IEPA's EMSA program offers great promise, assuming it can avoid the pitfalls experienced by EPA's Project XL. The XL program has lost impetus as a result of several factors, including the absence of a statutory/regulatory framework, an unclear definition of program goals and expectations, and establishment of a framework that defined the boundaries of stakeholder involvement.

Some quick success need to be achieved to ensure early momentum. Consequently, IEPA may want to exercise caution in considering early program applications, selecting those that offer a winning combination of results: valued reductions, economic efficiency, and a limited amount of resources invested in crafting the agreement. To the extent that the applicant can achieve reductions, and IEPA can grant regulatory flexibility without requiring EPA approval, the project can reduce potential bureaucratic entanglements. Such projects may be difficult to identify, however.

On the other hand, if the IJC and the Parties/Jurisdictions make a strong case that the persistent toxics are of serious concern, and an Illinois facility comes forward with a commitment to reduce such toxics within the EMSA framework, public interest groups may be more willing to support the program application. IEPA may want to establish an internal evaluation of potential recruits to market.

Michigan's C3 Program offers administrative flexibility to organizations that have strong environmental programs, as demonstrated by an in-place environmental management system, a

commitment to pollution prevention, and a consistent record of compliance. Michigan could actively recruit organizations that meet these criteria and have identified, or would be willing to identify, the persistent toxics as a significant aspect of their operations and activities. Recruiting these facilities, and offering regulatory flexibility in return for reductions of these contaminants would demonstrate the State's interest and commitment to the reduction of persistent toxics. To increase the likelihood of project successes, and a reduction of transaction costs, Michigan should consider reviewing informal letters of intent prepared by interested organizations, much as Illinois plans to do in the EMSA program.

Trading programs have been used on a fairly limited basis within a well-defined framework. At present, public interest organizations are somewhat skeptical of the concept. Nonetheless, trading programs offer tremendous potential and should be seriously considered as part of any beyond compliance program.

Many of the states have already initiated ambitious mercury reduction programs; however, some economic sectors are finding that eliminating mercury from their process is not technologically or economically feasible. If credits were established, it might be possible that larger organizations could sponsor collection programs as a means of demonstrating their commitment to environmental excellence in return for regulatory/administrative flexibility. For example, markets might be established enabling an existing source to participate in the cleanup of toxic burdens associated with historical contamination (e.g., in-place sediments) as an alternative to controlling its own emissions.

Trading programs could provide regulatory and operational flexibility while achieving greater emission reductions than those required under existing regulations. Trading would optimize the cost of complying with existing regulations and facilitate implementation of new standards. Trading programs have the potential to provide capacity for future growth while attaining and maintaining environmental standards. EPA policy, and possible regulatory, revisions may be necessary for market-based programs to be successful.

Alternatively, trading systems could be developed within a confined area, such as a publicly owned treatment work (POTW). Under this scenario, the POTW could allow indirect dischargers (i.e., including industrial, commercial, and residential source), to identify the most cost-effective reduction program to achieve water quality and sludge standards applicable through the POTW's permit. The program would be subject to the requirement that the loading could not exceed some pre-determined cap.

5. CONCLUSIONS

The United States, Canada, and the Great Lakes Provinces/States have developed a number of successful voluntary, beyond compliance programs. In general, the jurisdictions are expanding the number and reach of these programs. Additionally, the jurisdictions are actively developing experimental programs that offer program participants incentives in the form of administrative and regulatory flexibility.

Many of these beyond compliance programs have resulted in increasing participation rates, and some of them have documented release reductions. Whether these programs can be targeted to reducing a wider net of the Level I and Level II substances is, in part, a function of the source of the contaminants and how they are being used.

Exhibit 2 provided a brief overview of the known uses of each of the Level I and Level II substances. As was shown in Exhibit 2, many of the pesticides are banned in the United States, others are restricted. Additionally, many of the contaminants have no commercial value, and are generated as byproducts. In other cases, such as octachlorostyrene, no intentional commercial production ever existed, and the industrial process that generated this contaminant was discontinued in the 1970s. In still other cases (e.g., dioxin and PAHs), the substances are unintentional byproducts of current industrial practices.

The IJC and the Parties/Jurisdictions need to develop an inventory of uses, and estimated release rates associated with users, or at a minimum user communities, to assess what types of incentives may be appropriate to spur action on the part of user communities.

A reasonably accurate inventory for some of the contaminants, for example mercury, cadmium, and PCBs, has been established to identify sources. For those contaminants, incentive programs can be established to target voluntary reductions. For example, program managers may consider offering incentives to accelerate the retirement of PCB transformers and capacitors. The mercury reduction programs established throughout the Great Lakes demonstrate that targeted voluntary programs can be successful.

Whether voluntary, beyond compliance programs can generate sufficient reductions to satisfy ambient requirements is an open question. Nonetheless, it is a question that needs be answered prior to developing regulatory programs. A binational commitment is needed to develop and implement these programs in a cost-effective fashion.

APPENDIX A. INTERVIEWEES AND PROGRAMS DISCUSSED

Interviewee	Affiliation	Programs Discussed
Gary Gulizean Angela Bandemehr Paul Horvatin	EPA Region 5	Common Sense Initiative 33/50 Mercury Reduction Programs
Dan O'Riordan Phil Kaplan	EPA Region 5	Auto Industry Project Green Lights Energy Star Great Printers 33/50
Christine Urban	EPA Region 5	Mercury Reduction Programs for Hospitals
Bruce Varner Alexis Cain	EPA Region 5	CAA 112 waiver provisions CAA Trading Programs
Bob Tolpa	EPA Region 5	Common Sense Initiative
Peter Wise Kevin Green	Illinois Environmental Protection Agency	Graduate Intern Program Clean Break Environmental Accounting Partners in P2 Great Printers
John Kelly	Illinois Environmental Protection Agency	Clean Break
Roger Kanerva	Illinois Environmental Protection Agency	CAA Trading EMSA
Rene Cipriano	Illinois Environmental Protection Agency	EMSA ISO 14000 Audit Privilege & Immunity
Joy Taylor	Michigan Department of Environmental Quality	Mercury Reduction Programs CAA Trading Programs
G. Tracy Mehan, III	Michigan Office of the Great Lakes	33/50 Mercury Reduction Programs Environmental Accounting
David Batchelor	Michigan Department of Environmental Quality	CAA Trading CWA Trading
Bob Babcock	Michigan Department of Environmental Quality	Mercury Reduction at POTWs
Anita Singh Karl Zollner Marcia Horan Wendy Fitzner	Michigan Department of Environmental Quality	Great Printers Michigan Business Pollution Prevention Partnership Pulp and Paper Pollution Prevention Program RETAP Clean Corporate Citizen Program Automobile Pollution Prevention Project

APPENDIX A. INTERVIEWEES AND PROGRAMS DISCUSSED (Continued)

Interviewee	Affiliation	Programs Discussed
Brian LeClair	Ontario Ministry of Environment and Energy	Sector Partnerships - automobiles, automobile parts, metal finishers, printing and graphics
Fred Granek	Ontario Ministry of Environment and Energy	Sector Partnerships - chemical industry, automobile industry, metal finishers, printing, food processing Mercury Reduction at Hospitals
Esther Bobet Anita Li	Environment Canada	Accelerated Reduction and Elimination of Toxics (ARET) Green Clean Sector Partnerships - automobiles, auto body shops, dry cleaners, metal finishers
John Hewings	Ontario Ministry of Environment and Energy	Pollution Prevention Pledge Program Canadian Chemical Producer MOU Mercury Reduction at Hospitals